

In the Specification:

On page 1, after the title insert the following:

RELATED APPLICATIONS

This is a U.S. national stage of application No. PCT/DE2003/003240, filed on 29 September 2003.

This patent application claims the priority of German patent application no. 102 45 930.4, filed 30 September 2002, the disclosure content of which is hereby incorporated by reference.

FIELD OF THE INVENTION

On page 1, amend the paragraph beginning on line 6 as follows:

The present invention relates to an optoelectronic component ~~in accordance with the precharacterizing part of patent claim 1 and to a component based module in accordance with the precharacterizing part of claim 17~~ arrangement which allows adjacent components to be in closer proximity to each other.

On page 1, before line 10, insert the following heading and paragraph:

BACKGROUND OF THE INVENTION

In the following discussion, terms will be used having these definitions. A "semiconductor arrangement" is a stack of semiconductor layers (including an active optical layer) grown on a substrate. This is designated on the drawing by reference numeral 4. A "semiconductor component" includes a carrier substrate (designated by reference numeral 2 in the drawing), isolating/connecting layers (13/14), a semiconductor arrangement (4), and electrical connections,

such as bonding wires (7) to the semiconductor arrangement. A "semiconductor chip" includes a carrier (2), the isolating/connecting layers (13/14), and the semiconductor arrangement (4). A "module" is an arrangement of semiconductor components.

On page 1, amend the paragraph beginning on line 15 as follows:

An arrangement of this type, referred to as an LED module, is known from ~~DE 10051159 A1~~ co-pending US patent application Serial No. 10/414,739. In this case, a plurality of optoelectronic semiconductor arrangements or semiconductor chips are mounted on a carrier which is in turn arranged on a heat sink. Despite the increasing packing density of the semiconductor components, it is possible to dissipate the heat produced. In this case, the heat produced must not affect the electrical behavior of the semiconductor component, however, or must affect it only insignificantly. This practice reduces the efficiency of the overall module on account of the absorption of the radiation from adjacent semiconductor components, however.

On page 2, before line 10, insert the following heading:

SUMMARY OF THE INVENTION

On page 2, delete the paragraph beginning on line 21 through line 25 in its entirety.

On page 5, amend the paragraph beginning on line 13 as follows:

The optoelectronic component based on the invention has a cavity or cutout in the basic housing which (cavity or cutout) contains the semiconductor arrangement which emits and/or receives electromagnetic radiation. Unlike in conventional optoelectronic components, the reflector

is at least produced not just by reflective lateral faces of the cavity in the basic housing itself, but rather at least partly by a reflective filling compound which the cavity contains. For this, the material and the quantity of filling compound are chosen such that, during and/or after filling, the adhesive force between the material of the filling compound and the material of the lateral faces of the cavity causes the filling compound to rise up on these lateral faces and form a curved ~~parabola-shaped~~ surface. This filling compound surface facing the front of the housing serves as a reflective area for electromagnetic radiation emitted and/or received by the semiconductor arrangement.

On page 5, amend the paragraph beginning on line 33 as follows:

In other words, the cavity is partly filled with the filling compound, and the adhesive force between the filling compound and the basic housing causes the filling compound to form a curved ~~concave~~ surface in the cavity automatically, since the filling compound rises up on the lateral internal faces of the cavity of the basic housing. The filling compound's curved ~~parabolic~~ internal faces formed in this manner form the reflector for the semiconductor arrangement inserted into the cavity.

On page 6, amend the paragraphs beginning on lines 5 and 16 as follows:

Even with a very small width of the openings ~~in the cavities~~, these reflective areas can easily be produced in the cavity through suitable dosage of the filling compound. As a result, the lateral walls of the housing and the filling compound behave like a single reflector, which further improves the light radiation power. In addition, the conductor tracks, wires and the like which the cavity contains are enveloped by the filling compound without impairing the manner of operation thereof.

Hence, even in the case of optoelectronic components with ~~narrow~~ a very small width of the openings ~~in the cavity~~ and/or complex semiconductor arrangement and wiring arrangements in the cavity, the inventive measure can be used to provide reflectors within the cavity and hence to increase the light efficiency of the components.

On page 8, delete the paragraph beginning on line 24 through line 27 in its entirety.

On page 8, before line 29, insert the following heading:

BRIEF DESCRIPTION OF THE SINGLE DRAWING

On page 8, before line 32, insert the following heading:

DETAILED DESCRIPTION OF THE SINGLE DRAWING

On page 8, amend the paragraph beginning on line 32 as follows:

In the case of the optoelectronic component 1 shown in the figure, a semiconductor arrangement 4 emitting and/or receiving electromagnetic radiation is arranged on a carrier 22. The carrier 22 is thermally conductively connected to a heat sink 12 made of copper, aluminum or molybdenum, for example. External electrical connections 9 are electrically connected to the semiconductor arrangement 4 or to an electrically conductive layer 13 via bonding wires 7. The electrically conductive layer 13 makes contact with the underside of the semiconductor arrangement 4, which is constructed such that a current can flow vertically through the arrangement, e.g. by virtue of the substrate being ~~conducted~~ conductive for the active layer which produces the light.

Thus, electric contacts need to be provided on the upper and lower surfaces of the semiconductor arrangement.

On page 9, amend the paragraph beginning on line 9 as follows:

In another embodiment with an insulating substrate for the active layer, a current can flow only in a lateral direction through the semiconductor layers. In this case, electrical contacts and both bonding wires are on the upper surface of the semiconductor arrangement. the second bonding wire is likewise routed to the semiconductor chip directly.

On page 9, amend the paragraph beginning on line 37, as follows:

Likewise directly on the heat sink 12, external electrical connections 9 are arranged in electrically insulated fashion and at a distance from the carrier 22. The external electrical connections 9 are preferably conductor tracks from printed circuit boards 10 which are arranged above one another and which form the connection arrangement 8. The two chip connections require at least one printed circuit board in that one printed board can have two different conductor tracks, each track connecting one chip connection. A plurality of chips in a module are preferably connected by multilayer printed circuit boards which allow flexible connection, for example series connection of components arranged in the form of a matrix. Different conductor tracks on various printed circuit boards are connected by means of plated-through holes respectively between the basic housing 20 and the heat sink 12 of an optoelectronic component.

On page 10, amend the paragraph beginning on line 15 as follows:

The semiconductor arrangement 4 with the carrier 22 is situated in a basic housing 20 with a cutout or cavity 3. The basic housing may be a frame which is mounted on the printed circuit boards 10 [[8]] with the electrical connections 9. This allows a very compact design for the inventive component 1. This also allows the inner side 17 of the basic housing 20 to be in the form of a reflector 30 in order to output as much and as directional light as possible from the component.

On page 11, amend the paragraph beginning on line 6 as follows:

As seen from the semiconductor chip 4, the filling compound surface which faces the front 21 of the basic housing 20 is curved ~~convex~~ and forms a reflective area at least for a portion of the radiation emitted and/or received at the side.

On page 11, amend the paragraph beginning on line 18 as follows:

As can be seen in the sectional view of the figure, the filling level of the filling compound 16 is low adjacent to the semiconductor chip 4, i.e. adjacent to the carrier 22. This means that the curved shape of the surface of the filling compound 16 opens essentially ~~parabolically~~ toward the front in conjunction with the surface 30 of the lateral wall of the housing 20. With a suitable choice of material and of dosage for the filling compound, this shape is obtained automatically on account of the adhesive forces between the filling compound and the material of the housing frame 20. The curved ~~concave~~ inner faces of the filling compound 16 (as seen from the semiconductor chips 4) serve as reflector for the radiation which is emitted and/or received by the semiconductor chips 4 at the side.

On page 12, delete the paragraph beginning on line 17 through line 28 in its entirety and insert the following paragraph:

The scope of protection of the invention is not limited to the examples given hereinabove. The invention is embodied in each novel characteristic and each combination of characteristics, which includes every combination of any features which are stated in the claims, even if this combination of features is not explicitly stated in the claims.